

CLAIMS

I claim:

1. A multipackage module having a second package stacked over a first package, each said package comprising a die attached to a substrate, the second package substrate and the first package substrate being interconnected by wire bonding, wherein the first package comprises a ball grid array package.
2. The multipackage module of claim 1 wherein at least one said package has wire bond interconnect of the die with the substrate, and the said wire bonded package is at least partly encapsulated.
3. The multipackage module of claim 1 wherein the second package has wire bond interconnect of the die with the substrate.
4. The multipackage module of claim 3 wherein the second package is fully encapsulated.
5. The multipackage module of claim 3 wherein the second package is encapsulated to an extent sufficient to protect wire bonds between the die and the substrate.
6. The multipackage module of claim 1 wherein the second package is a land grid array package.
7. The multipackage module of claim 1 wherein the land grid array package substrate is a single-metal layer substrate.
8. The multipackage module of claim 1, further comprising a heat spreader having a generally planar upper surface exposed at the top of the module.
9. The multipackage module of claim 8 wherein a planar part of the heat spreader is supported by support members over the first package substrate.
10. The multipackage module of claim 8 wherein a planar part of the heat spreader is affixed onto an upper surface of the second package.

11. The multipackage module of claim 1, further comprising an electromagnetic shield for at least one of the packages.
12. The multipackage module of claim 1, further comprising an electromagnetic shield for the first package.
13. The multipackage module of claim 12 wherein the second package is affixed onto an upper surface of the electromagnetic shield.
14. A method for making a multipackage module, comprising
providing a BGA first package comprising a first package substrate,
providing a second package comprising a second package substrate,
stacking the second package over the first package, and
electrically interconnecting the first and second package by wire bonds connecting the first and second substrates.
15. The method of claim 14, said BGA first package being a molded package, the molding having a generally planar upper surface, wherein stacking the second package over the first package comprises applying an adhesive onto the molding upper surface and placing the second package onto the adhesive.
16. The method of claim 15 wherein the adhesive is a curable adhesive, and further comprising curing the adhesive.
17. The method of claim 14 wherein providing the BGA first package comprises providing an unsingulated strip of BGA packages.
18. The method of claim 14 where providing the BGA first package comprises testing BGA packages for a performance and reliability requirement and identifying the said first package as meeting the requirement.
19. The method of claim 14 where providing the second package comprises testing packages for a performance and reliability requirement and identifying the said second package as meeting the requirement.

20. The method of claim 14, further comprising attaching second-level interconnect malls onto the BGA first package substrate.
21. The method of claim 14, further comprising encapsulating the stacked packages in a multipackage module molding.
22. The method of claim 14, further comprising singulating the modules.
23. The method of claim 14 wherein providing the second package comprises providing a land grid array package.
24. The method of claim 14 wherein providing the second package comprises providing a land grid array package, the land grid array package being at least partially molded.
25. The method of claim 24, the land grid array package being fully molded.
26. The method of claim 24, the wire bonds of the land grid array package being molded, and at least a portion of the upper surface of an upper die being exposed.
27. The method of claim 14 wherein the BGA first package is provided with an electromagnetic shield affixed over the die.
28. The method of claim 27, the shield having a generally planar upper surface, wherein stacking the second package over the first package comprises applying an adhesive onto the shield upper surface and placing the second package onto the adhesive.
29. The method of claim 28 wherein the adhesive is a curable adhesive, and further comprising curing the adhesive.
30. The method of claim 14, further comprising providing a heat spreader.
31. The method of claim 30, wherein providing a heat spreader comprises carrying out a drop-in mold operation, the heat spreader being placed into a mold prior to forming a module molding.

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32. The method of claim 30, wherein providing a heat spreader comprises affixing a generally planar portion of a heat spreader onto a generally planar upper surface of the second package.